

Flight Instruments at JPL

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JPL Flight Instruments

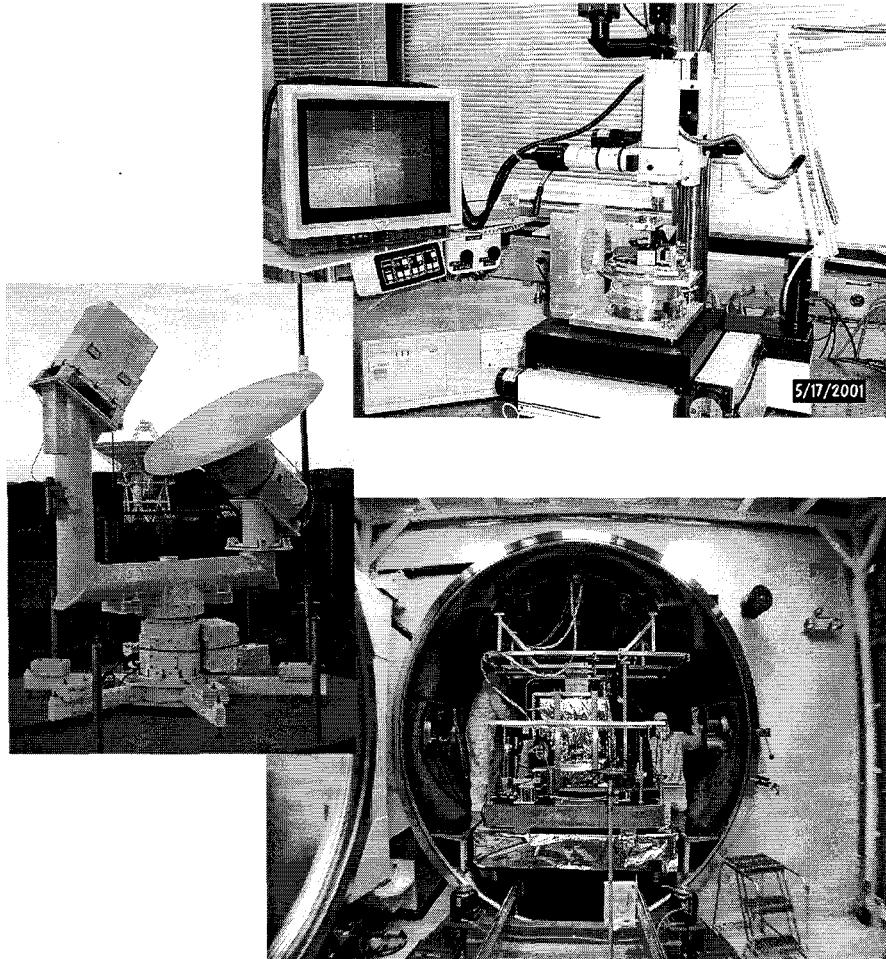
Mission Statement

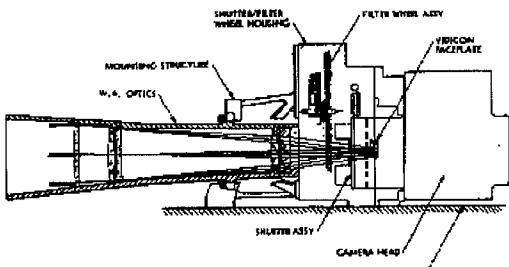
- The Observational Systems Division is responsible for the implementation of advanced space instrument systems projects for Planetary, Astrophysics, and Earth Science investigations.
- Further, we are also responsible for the development and infusion of advanced technologies into space instrument systems in partnership with the technology developers.
- Our tasks cover the electro-magnetic spectrum from the Ultra-Violet through the Submillimeter wave range of wavelengths and include not only hardware development, but associated data systems and science data processing.

Cameras, Spectrometers, Imagers, Radiometers, Interferometers, LIDARs

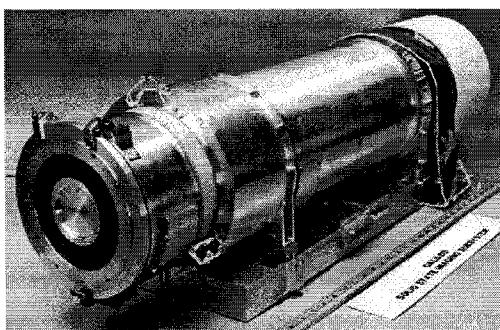
JPL Flight Instrument Capabilities

- All required facilities for space flight hardware development
- In Division
 - Clean rooms
 - Thermal vacuum chambers
 - Ground test and calibration equipment
 - Precision positioning facility
 - Silicon micro-machining facilities
 - Electron beam lithography
- At JPL
 - Machine shops
 - Flight hybrid fabrication
 - Vibration and Acoustic testing
 - EMC/EMI testing

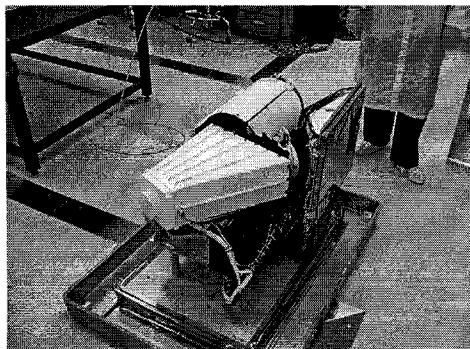




Voyager

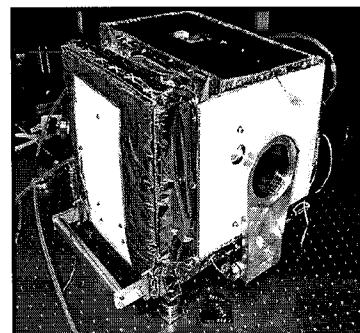


Galileo SSI

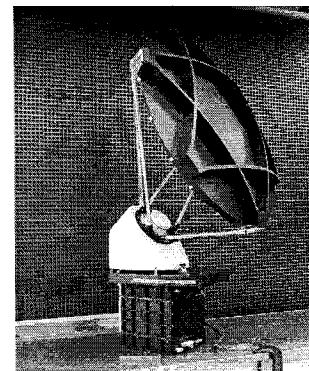


Cassini VIMS

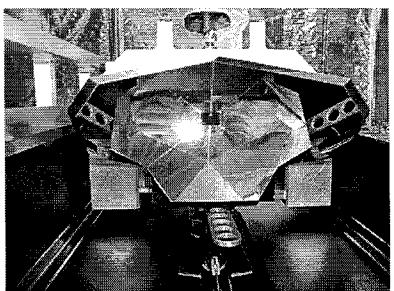
Instruments Built at JPL



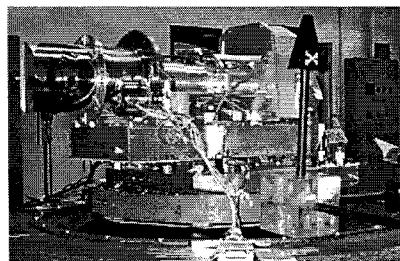
DS-1 MICAS



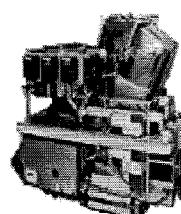
Jason



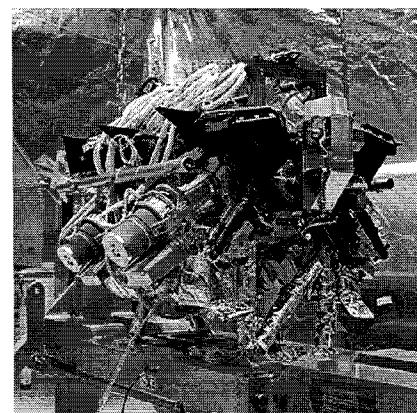
EOS TES



Stardust



AVIRIS*



EOS MISR



GALEX

PROPRIETARY DATA - JPL/AEROSPACE MOU

THE AEROSPACE
CORPORATION

JPL

13 July, 2001

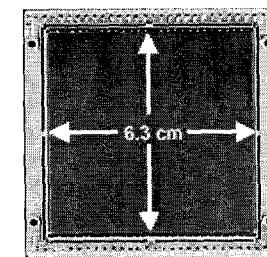
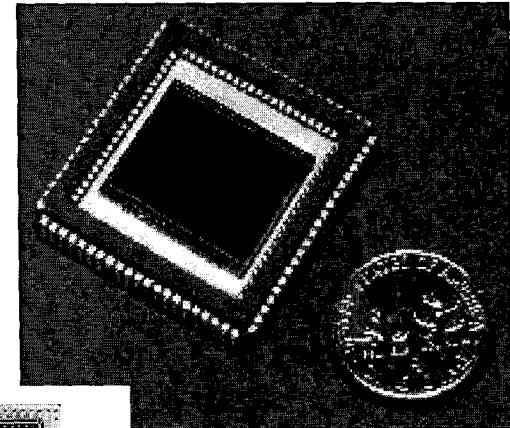
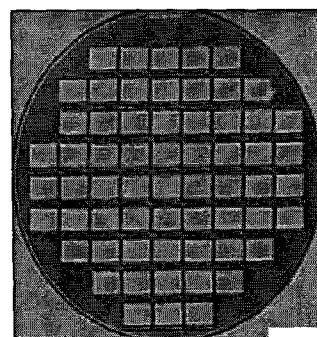
Unique Capabilities in Flight Instrument Systems Development

- Instrument system engineering
 - Extensive experience in building high quality space borne hardware
 - Depth of expertise
 - Hostile environments--Galileo, Mars surface missions, Europa
 - Long life--Voyagers, Cassini, Pluto
 - Extensive experience in developing and implementing science data processing facilities including algorithm development
 - Voyager, Galileo, Cassini,
 - EOS MISR, Aster, TES
 - AVIRIS
- Instrument system requirements flowdown
 - Analysis to determine correct requirements and balanced tolerances
- Calibration
 - In-depth understanding of technology and science goals

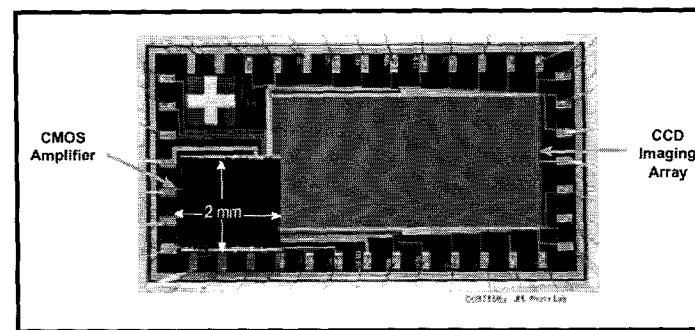
Instrument Technologies

Detectors

- CMOS Imagers
 - Low power
 - Fast readout
- CCDs
 - High fidelity
 - Ultra low noise
- CCD/CMOS hybrid
 - Best of both worlds
- Thermopiles
 - Long Wave IR response
 - Room temperature operation
- Quantum Well
 - Large area
 - Uniform response
 - High stability
 - High radiation tolerance



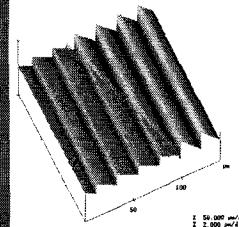
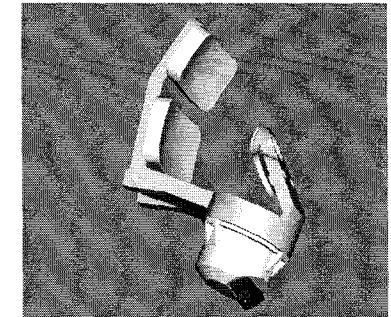
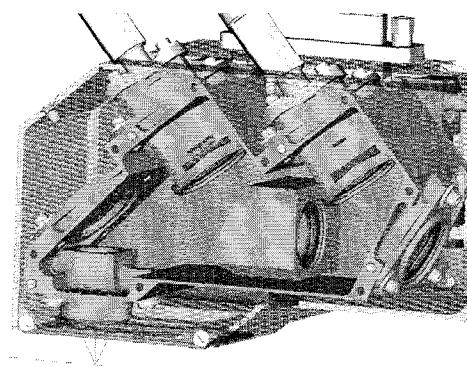
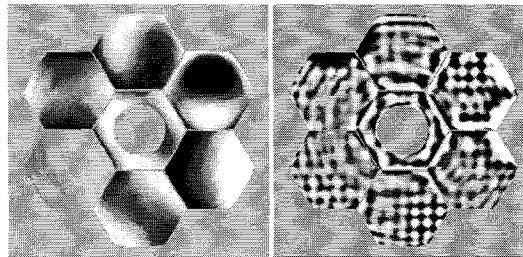
4096 x 4096 Pixel Imager



Instrument Technologies

Optics

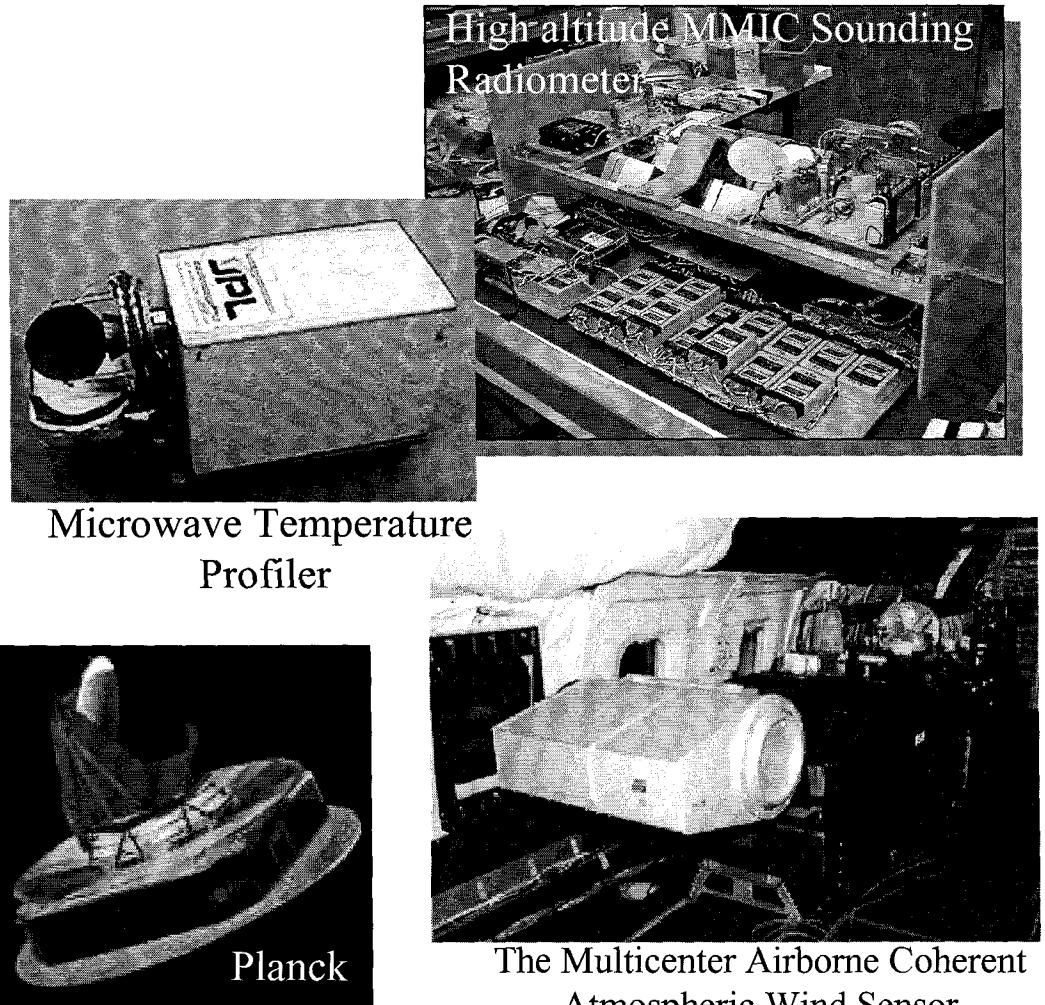
- Adaptive Optics
 - Corrective algorithms and hardware
 - Next Generation Space Telescope
- Deployable Optics
 - Large structures
- Innovative Spectrometers
 - Offner
 - Dyson
 - Raman
- E-beam Gratings
 - High efficiency, low scatter



Instrument Technologies

Microwave and Sub-Millimeter

- MMIC amplifiers
 - Low noise and low power versions
- Schottky mixers
- Low temperature HEB, SIS Mixers
- Tunable submm-wave THz sources
 - multipliers, nanoklystron, photomixers
- Microlidars



Science Data Systems and Analysis

- Perform research and advanced development
 - Information systems
 - Scientific image and data processing
 - Information extraction
- Support pre-flight and in-flight instrument calibration
- Develop instrument flight software
 - Instrument control
 - Instrument calibration

Cassini @ Jupiter
SIR-A @ New Guinea
Ranger7 @ Moon
MISR @ NY
Magellan @ Venus

